IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellants	Tim Sievers, *et al.*
Serial No. 10/719,585	Filing Date: November 21, 2003
Title of Application:	Method and Apparatus for the Production of a Workpiece of Exact Geometry
Confirmation No. 3272	Art Unit: 1732
Examiner	Matthew J. Daniels

Mail Stop Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Appeal Brief Under 37 CFR §41.37

Dear Sir:

A Notice of Appeal from the final rejection of Claims 1-5, 7 and 8, all pending claims of U.S. Patent Application No. 10/719,585, having been filed on July 17, 2007, Appellant accordingly files its Appeal Brief in connection with its appeal. A Claims Appendix is submitted herewith, as are Appendices related to evidence previously submitted and decisions related to the case.

(i) Real Party In Interest

The real party in interest is BU:ST GmbH of Muenchen, Germany, assignee of the present patent application.

(ii) Related Appeals and Interferences

There are no related Appeals or Interferences.

(iii) Status Of Claims

Claim 6 has been cancelled. Claims 1-5, 7 and 8 stand rejected and are the subject of the instant Appeal. A copy of each of these claims is attached hereto in the Claims Appendix.

(iv) Status Of Amendments

No amendments have been filed since the Final Office Action mailed April 18, 2007.

(v) Summary Of Claimed Subject Matter

Claims 1 and 7 are the rejected independent claim and are discussed below.

Independent Claim 1

Claim 1 is directed to a method for the production of a work piece (1) by the successive compacting, by means of electromagnetic radiation or particle radiation, of powdered starting material (3) that has been applied horizontally in layers, so that each layer (n, n+x, n-x) consisting of at least one trace comprises two substantially vertical lateral faces and one substantially horizontal upper face which, in turn, forms the basis for a possible subsequent layer. *See, e.g.,* Spec. page 1, lines 5-10, page 2, lines 14-20 and 27-31, page 5, lines 11-18; Figs. 1-3. At least one of the two vertical side walls is subject to mechanical finishing subsequent to the compacting of the powdered starting material (3) that has been applied horizontally in layers (n, n+x, n-x). *See, e.g.,* Spec. page 1, lines 10-13, page 2, lines 20-27, page 5, lines 29-36; Figs. 1, 4, 6, 8. The work piece (1) to be formed is surrounded by the powdered starting material (3) during its production and during the mechanical finishing, and the mechanical finishing of a vertical side wall of an n^{th} layer is performed after the generation of an $n + x^{th}$ layer only and such that mechanical finishing of the $n + x^{th}$ layer is not performed at the same time as mechanical finishing of the n^{th} layer. *See, e.g.,* Spec. page 1, lines 13-16, page 2, lines 22-25, page 3, line 29 – page 4, line 12, page 5, lines 32-36, page 6, lines 16-24, page 7, lines 13-19; Figs. 1, 4, 6, 8.

Independent Claim 7

Claim 7 is directed to a method for the production of a work piece (1) where at least one first horizontal layer (n) of powdered starting material (3) is provided and compacted by means of electromagnetic radiation or particle radiation to form at least one first trace, and at least one second horizontal layer (n+1) of powdered starting material (3) is provided and compacted by means of electromagnetic radiation or particle radiation to form at least one second trace, each of the first and second traces comprising two substantially vertical lateral faces surrounded by the powdered starting material (3). *See, e.g.,* Spec. page 1, lines 5-10, page 2, lines 14-20 and 27-31, page 5, lines 11-18; Figs. 1-3. Subsequent thereto, at least one of the two vertical side walls of the at least one first trace (n), but no side walls of the at least one second trace (n+1), is mechanically finished while the at least one first trace is still surrounded by the powdered starting material. *See, e.g.,* Spec. page 1, lines 10-16, page 2, lines 20-27, page 3, line 29 – page 4, line 12, page 5, lines 29-36, page 6, lines 16-24, page 7, lines 13-19; Figs. 1, 4, 6, 8.

(vi) Grounds Of Rejection To Be Reviewed On Appeal

Claims 1, 2, 4, 5, 7 and 8 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Benda (U.S. Patent No. 5,427,733) in view of Herfurth (DE 19533960).

Claim 3 stands rejected under 35 U.S.C. 103(a) as being unpatentable over Benda in view of Herfurth, and further in view of Prinz (U.S. Patent No. 5,207,371).

(vii) Argument

Rejection of Claims 1, 2, 4, 5, 7 and 8 over Benda in view of Herfurth

The present invention, as claimed, is directed to a method for the production of a work piece, such as a form tool, with exact geometry and high surface quality. The work piece is constructed using a process wherein powder coatings are applied one on top of each other, by means of compaction. After the powder has been compacted, the surfaces thereof are finely machined in a mechanical manner. More specifically, all claims require that each layer be mechanically finished while the layer is still surrounded with powdered starting material. Appellant respectfully submits that at least this highlighted element is not disclosed, taught or suggested by the cited prior art in any way.

In the Office Action mailed on September 28, 2006, the Examiner states that it would be inherent for the work piece of Benda to be surrounded during production. However, Appellant respectfully notes that all pending claims require that the layers be

surrounded with powdered starting material as they are mechanically finished. Clearly, such can not be disclosed by Benda, since Benda is silent as to mechanical finishing.

The Examiner also states, in the Office Action mailed on September 28, 2006, that: "In the combination, there is no teaching from the art that one should remove the powder between layers, and it would have been obvious to keep the powder in place to avoid the time wasted in removal of the powder." Appellant points out that the very premise of this statement, i.e., that there is no teaching in the prior art combination that one should remove the powder between layers, is clearly erroneous. Herfurth clearly and repeatedly teaches in column 10, lines 20-25 and 53-65 that powder that was not used should, in fact, be removed between layers. According to these paragraphs, the technical teaching is very clear and concise that the workpiece will be free of any powder prior to the mechanical finishing process being initiated. For example, following is a translation of col. 10, lines 20 to 25:

> Around the working area, i.e. the area around which the workpiece is being built layer-by-layer, where the melted powder and the layers will be mechanically finished, a sucking device 26 is provided to suck away the surplus powder or the residue created during the melting process step.

Thus, Herfurth does, in fact, teach that each layer not be mechanically finished while the layer is still surrounded with powdered starting material, in direct contradiction to the above-discussed element required by all claims.

Thus, Appellant respectfully submits that it would not have been obvious to have modified the Benda and Herfurth combination to arrive at this above-discussed aspect of the claimed invention. It is well settled that a prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention. *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), *cert. denied*, 469 U.S. 851 (1984). Here, there is absolutely no suggestion in the Benda reference to perform mechanical finishing on a layer while that layer is surrounded with powdered starting material, and the Herfurth reference expressly teaches away from this concept by teaching that the workpiece should be free of any powder prior to the mechanical finishing process being initiated.

Moreover, Appellant respectfully submits that such a modification is contrary to the conventional wisdom of those skilled in the art. It is generally understood that it is undesirable to mechanically finish a compacted layer while the layer is still surrounded with powdered starting material, since the traditional tools for mechanical finishing generally cause substantial disturbances in the powdered starting material, which makes it more difficult to form subsequent layers. However, Appellant has invented a mechanical finishing tool having a configuration which allows it to produce acceptable results, while at the same time being very small in diameter (typically having a diameter

of about 0.5 mm). Using such a tool, Appellant has, contrary to conventional wisdom, discovered that mechanical finishing can be performed by dipping the tool into the powdered starting material surrounding the work piece without any disturbances in the powdered starting material. As such, the present invention can provide a finishing process more efficient and productive than the prior art method for finishing the multiple layers of the work piece. Appellant has also surprisingly discovered that the inventive method is capable of producing a better finish than previously known methods, because the abrasiveness of the powdered starting material surrounding the layers during mechanical finishing actually may enhance such finishing.

While Appellant recognizes that the tool developed by Appellant is not claimed in the present application, it is discussed herein merely to explain to the Examiner how it was able to overcome the conventional wisdom in the prior art that it is undesirable to mechanically finish a compacted layer while the layer is still surrounded with powdered starting material.

In the Final Office Action, the Examiner has cited *Ex Parte Rubin*, 128 USPQ 440 (Bd. Pat. App. & Int. 1959), for the proposition that "the rearrangement of the order of steps disclosed by the prior art is generally prima facie obvious." While Appellant acknowledges that this proposition is generally true, the situation here is not merely a

rearrangement of the order of steps. Rather, the cited prior art itself, along with the conventional wisdom in the art (which obviously would be known to one skilled in the art), directly teaches away from a rearrangement of the order of steps. As such, Appellant respectfully submits that the modification to the order of steps necessary to arrive at the claimed invention clearly would not have been obvious.

To summarize, concerning the requirement of all claims that a layer be mechanically finished while the layer is still surrounded with powdered starting material, one skilled in the art is faced with the following:

a) Benda, which is completely silent as to mechanical finishing in general, and consequently completely silent as to whether a layer should be surrounded with powdered starting material during mechanical finishing;

b) Herfurth, which clearly and repeatedly teaches that each layer should not be mechanically finished while the layer is still surrounded with powdered starting material; and

c) the conventional wisdom in the art (which is not aware of the tool recently developed by Appellant and described in the present application), which recognizes that that it is undesirable to mechanically finish a compacted layer while the layer is still surrounded with powdered starting material.

It is difficult to comprehend how one skilled in the art faced with these prior art teachings would somehow arrive at the claimed invention without the present application being used as a roadmap, since it is only the present application which goes against Herfurth and the conventional wisdom in the art to suggest that a layer should be mechanically finished while the layer is still surrounded with powdered starting material.

Rejection of Claim 3 over Benda in view of Herfurth and further in view of Prinz

Claim 3 depends from Claim 1, and as such, Appellant respectfully submits that Claim 3 is patentable over Benda in view of Herfurth for the reasons set forth above. Furthermore, Appellant respectfully submits that Prinz discloses nothing that would render obvious the present invention as claimed, either alone or in combination with the teachings of Benda and/or Herfurth.

As with Benda, Prinz also clearly does not disclose, teach or suggest that a layer should be or even could be mechanically finished while the layer is still surrounded with powdered starting material, since it is clearly described in the text, and shown in the Figures, of Prinz that there is no powdered starting material surrounding any layer as it is being mechanically finished.

Thus, even when Prinz is added to the analysis, concerning the requirement of all claims that a layer be mechanically finished while the layer is still surrounded with powdered starting material, one skilled in the art is faced with the following:

a) Benda, which is completely silent as to mechanical finishing in general, and consequently completely silent as to whether a layer should be surrounded with powdered starting material during mechanical finishing;

b) Prinz, which clearly describes in the text, and shown in the Figures, that there is no powdered starting material surrounding any layer as it is being mechanically finished;

c) Herfurth, which clearly and repeatedly teaches that each layer should not be mechanically finished while the layer is still surrounded with powdered starting material; and

d) the conventional wisdom in the art (which is not aware of the tool recently developed by Appellant and described in the present application), which recognizes that that it is undesirable to mechanically finish a compacted layer while the layer is still surrounded with powdered starting material.

Again, it is difficult to comprehend how one skilled in the art faced with these prior art teachings would somehow arrive at the claimed invention without the present application being used as a roadmap, since it is only the present application which goes

against Herfurth and the conventional wisdom in the art to suggest that a layer should be mechanically finished while the layer is still surrounded with powdered starting material.

Conclusion

For the foregoing reasons, Appellant respectfully submits that the claimed invention embodied in each of claims 1-5, 7 and 8 is patentable over the cited prior art. As such, Appellant respectfully requests that the rejections of each of claims 1-5, 7 and 8 be reversed and the Examiner be directed to issue a Notice of Allowance allowing each of these claims.

Respectfully submitted,

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Claims Appendix
to Appeal Brief Under 37 CFR §41.37
Serial No. 10/719,585

1. A method for the production of a work piece by the successive compacting, by means of electromagnetic radiation or particle radiation, of powdered starting material that has been applied horizontally in layers, so that each layer consisting of at least one trace comprises two substantially vertical lateral faces and one substantially horizontal upper face which, in turn, forms the basis for a possible subsequent layer, wherein at least one of the two vertical side walls is subject to mechanical finishing subsequent to the compacting of said powdered starting material that has been applied horizontally in layers, and wherein the work piece to be formed is surrounded by said powdered starting material during its production and during the mechanical finishing, wherein the mechanical finishing of a vertical side wall of an n^{th} layer is performed after the generation of an $n + x^{th}$ layer only and wherein mechanical finishing of the $n + x^{th}$ layer is not performed at the same time as mechanical finishing of the n^{th} layer.

2. The method according to claim 1, wherein at least one further layer has been produced between the production of the nth layer and the beginning of the mechanical finishing of this layer.

3. The method according to claim 1, wherein several layers are finished simultaneously.

4. The method according to claim 1, wherein several layers are comprised to form layer packages.

5. The method according to claim 4, wherein the mechanical finishing of the n -1st layer package is started after the generation of an nth layer package.

6. (cancelled)

7. A method for the production of a work piece comprising the steps of:

providing at least one first horizontal layer of powdered starting material;

compacting, by means of electromagnetic radiation or particle radiation, the at least one first horizontal layer of powdered starting material to form at least one first trace, each trace comprising two substantially vertical lateral faces surrounded by the powdered starting material;

providing at least one second horizontal layer of powdered starting material;

compacting, by means of electromagnetic radiation or particle radiation, the at least one second horizontal layer of powdered starting material to form at least one second trace, each trace comprising two substantially vertical lateral faces surrounded

by the powdered starting material; and

mechanically finishing at least one of the two vertical side walls of the at least one first trace, but no side walls of the at least one second trace, while the at least one first trace is still surrounded by the powdered starting material.

8. The method of Claim 7 further comprising the steps of:

providing at least one third horizontal layer of powdered starting material;

compacting, by means of electromagnetic radiation or particle radiation, the at least one third horizontal layer of powdered starting material to form at least one third trace, each trace comprising two substantially vertical lateral faces surrounded by the powdered starting material; and

mechanically finishing at least one of the two vertical side walls of the at least one second trace, but no side walls of the at least one third trace, while the at least one second trace is still surrounded by the powdered starting material.

Evidence Appendix
to Appeal Brief Under 37 CFR §41.37
Serial No. 10/719,585

No evidence of any kind, including evidence submitted under 37 CFR 1.130, 1.131 or 1.132, has been entered by the Examiner and relied upon by Appellant in the appeal.

Related Proceedings Appendix
to Appeal Brief Under 37 CFR §41.37
Serial No. 10/719,585

There are no related Appeals or Interferences. As such, there are no decisions rendered by a court or the Board in any such Appeals or Interferences.